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**Optics for Distributed Learning: Challenges and Opportunities**

In the last few years the demand for Machine Learning (ML) and Artificial Intelligence (AI) has experienced an unprecedented growth due to the improvement and availability of hardware accelerators. To increase the prediction capabilities and applications of deep learning models, deeper and larger models trained with larger amount of data are needed. The requirements of these new models is outpacing the hardware improvement, forcing scientists to rely on distributing the ML workload onto multiple accelerators instead of a single one. This approach to ML is called Distributed Learning (DL). The scaling of DL workloads is limited by communication/ computation time imbalance, making the network one of the key bottlenecks. Optics is one of the most promising technologies to overcome this bottleneck and maximise the capabilities of DL. This talk will introduce the main advantages and opportunities of optically interconnected DL systems and the challenges that need to be overcome to achieve them.